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THE METEOROLOGICAL OFFICE

MONTHLY WEATHER REPORT

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Climatological District Map
showing :-
A DISTRICTS (LARGE FIGURES)
0 = SCOTLAND NORTH
1 = SCOTLAND EAST
2 = ENGLAND EAST and NORTH—EAST
3 = EAST ANGLIA
4 = MIDLAND COUNTIES
5 = ENGLAND SOUTH—EAST and CENTRAL SOUTHERN
6 = SCOTLAND WEST
7 = ENGLAND NORTH—WEST and NORTH WALES
8 = ENGLAND SOUTH—WEST and SOUTH WALES
NI = NORTHERN IRELAND
B DISTRICT VALUE STATIONS (SMALL FIGURES) (see notes on Table 1)
C SEA AREAS, LIGHTHOUSES, LIGHT TOWERS and LIGHT VESSELS USED IN THE MONTHLY WEATHER REPORT
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Sea Area 2
Sea Area 3
Sea Area 4
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Longstone Lighthouse
Humber Light Vessel
Newarp Light Vessel
Shipwash Light Vessel
E.Goodwin Light Vessel
Royal-Sovereign Light Tower
Shambles Light Vessel
St Gowan Light Vessel
South Rock Light Vessel
Sevenstones Light Vessel
ZETLAND
ORKNEY
SUTHERLAND
CAITHNESS
ROSS AND CROMARTY
MORAY
BANFF
ABERDEEN
INVERNESS
KINC
ANGUS
ARGYLL
PERTH
FIFE
STIRLING
E.LOTH
BERWICK
LANARK
ROXBURGH
DUMFRIES
KIRKCUDBRIGHT
WIGTOWN
NORTHUMBERLAND
TYNE & WEAR
CUMBRIA
DURHAM
CLEVELAND
NORTH YORKSHIRE
LANCASHIRE
WEST YORKSHIRE
HUMBERSIDE
GREATER MANCHESTER
SOUTH YORKSHIRE
MERSEYSIDE
CHESHIRE
DERBY
NOTTS
LINCOLNSHIRE
CLWYD
GWYNEDD
STAFFS
SALOP
LEICESTER
NORFOLK
WEST MIDS
CAMBS
SUFFOLK
POWYS
WARWICK
NORTHANTS
BEDS
HEREFORD & WORCS
DYFED
GLOUCESTER
OXON
BUCKS
HERTS
ESSEX
GLAM
MID GLAM
GWENT
S GLAM
WILTSHIRE
BERKSHIRE
LONDON
KENT
SURREY
HAMPSHIRE
SOMERSET
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EAST SUSSEX
DEVON
DORSET
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Introduction

The *Monthly Weather Report* summarizes weather observations made at about 600 stations throughout the United Kingdom. Particulars of the standards required by the Meteorological Office and the methods to be adopted in making the observations are given in the *Observer's Handbook** . In addition to much other data, the Report contains almost all the items recommended in the World Meteorological Organization's *Guide to Climatological Practices* for inclusion in publications of climatological data.

The introduction to the *Monthly Weather Report,* is published separately at the end of the year to which it refers and forms an explanatory part of the volume. It gives particulars of any changes made since the previous year both in the observations and in the stations completing returns. It also provides informative notes on the features contained in the Report and gives advance notice, as necessary, of projected changes. Every three years or so a complete list of stations submitting climatological returns is published in the Introduction together with the names of the authorities responsible for them. The publication of an Annual Summary, similar to the monthly reports but containing additional tables, concludes the *Monthly Weather Report* for a particular year.

A brief history of the Monthly Weather Report

Monthly summaries of observations made at stations associated with the Meteorological Office were first published in 1869 in the *Quarterly Weather Report,* a publication issued for each of the years 1869 to 1880. The *Monthly Weather Report* commenced in 1884. The gap from 1881 to 1883 is bridged for synoptic stations by a supplement to the *Daily Weather Report* and for other stations by tables in *Observations at Stations of the Second Order.* For the first four years the *Monthly Weather Report* appeared as a separate publication and this practice was resumed in 1922. In the interim period, that is from 1888 to 1921, it was issued as a supplement to the *Weekly Weather Report,* at first styled a 'summary' and then from 1907 entitled *Monthly Weather Report.* Data on radiation relating to the period 1911-21 were published in the *British Meteorological and Magnetic Year Book,* Part 3, Section 2, and for the period 1922-56 in the *Observatories' Year Book;* they first appeared in the *Monthly Weather Report* in 1935. The Introduction to the 1915 volume gave a detailed resume of changes in content and layout, etc. up to that year and subsequent changes were set out and explained in later Introductions, notably in those in 1921, 1923, 1955 and 1971. The Annual Summary began in 1903.

Heights, time standard, interpolation

Unless otherwise indicated the height of a station above mean sea level (MSL) is the height above Ordnance Datum of the ground on which the raingauge stands, while the height of barometer above MSL refers to the height above Ordnance Datum of the barometer cistern or precision aneroid. A note on the errors arising from differences between the old Liverpool Ordnance Datum and the Newlyn Ordnance Datum adopted in Great Britain in 1933 was included in the Introduction to the 1953 volume. From 1 January 1964 altitudes in Northern Ireland refer to the Belfast Datum which, on average, is about 0.3 metres (m) lower than the Newlyn Datum.

All times in the *Monthly Weather Report* are in Greenwich Mean Time (GMT) and observations are made at the same time GMT throughout the year.

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*London, Meteorological Office, *Observer's Handbook* (Met.0.805), 3rd Ed.London, HMSO, 1969

When observations for any station are incomplete it may be possible to estimate values for the missing data by using reports from neighbouring stations. Details of the treatment of such values are given in the notes on the individual tables.

Contents of the Monthly Weather Report

The monthly parts of the *Monthly Weather Report* and the Annual Summary have the following features in common: remarks on the weather, five climatological maps, Tables 1 to 6 and late or amended data. The summary for the year has, in addition, Tables 7 to 12. A description of these features now follows.

Remarks on the weather

Remarks are given on the prominent features of the weather over the United Kingdom under a brief heading descriptive of the special characteristics.

Table 1 District values

Although the system of using the mean of statistics of a selection of stations to represent district values was initiated in the *Weekly Weather Report* in 1878, it was introduced in the *Monthly Weather Report* only in 1908. At first the district values were given in the table of station summaries but in 1912 they were transferred to a special table called 'District Values' which, in 1914, was numbered Table 1. Elements at first included in this table were air temperature, earth temperature, sunshine, rainfall, cloud amount and pressure at MSL for the Districts 0 to 11. Districts 0 to 8 approximated to the present districts. Districts 9 and 10 (north and south Ireland respectively) and District 11 (English Channel) continued until 1940; in 1941 Northern Ireland, as a separate un-numbered district, was added to Districts 0 to 8. Notable changes during the evolution of this table occurred in the following years: 1928 when data for pressure and cloud were discontinued; 1941 when the table assumed substantially its present form; 1964 when data for the whole of Scotland and the whole of England and Wales were included (although the percentages of average rainfall, based on data from a larger number of stations than those used in the individual districts, had appeared regularly in the text since 1921); 1971 when the individual district values of percentages of average rainfall were also calculated using a larger number of stations, and data for earth temperature at 122cm ceased.

The major reorganisation of local government which took place in England and Wales during 1974 led to the creation of several new counties and to large changes in the boundaries of certain of the older counties. As a consequence it was necessary to modify the boundaries of the climatological districts in England and Wales but the changes were made as small as possible. The new climatological districts were introduced on 1 January 1974.

The district values for air temperature, earth temperature, rain days and sunshine are currently computed from the available values for the individual stations (known as 'District Value Stations') listed below. Five such stations are normally selected for each of these elements as representative of each climatological district except for earth temperature where the scarcity of long-period stations has restricted the choice in some districts. Northern Ireland constitutes one district and each of the other nine are made up of a number of adjacent counties in Great Britain broadly grouped according to their general climatic features. The districts, together with the positions of the District Value Stations used in each district, are shown on the map on page ii. The highest maximum and lowest minimum air temperatures are for the District Value Stations only. The differences from average of air temperature, earth temperature and number of rain-days and the percentage of average sunshine for each district are the means of the corresponding values for each District Value Station except in Northern Ireland where a larger number of stations is used to calculate the mean rain-day anomaly for the area. In order to obtain a representative areal average, percentages of average rainfall in each District are the means of the corresponding values for a larger number of stations than the District Value Stations used for the other elements. The number varies with district from 13 in England E. (District 3) to 30 in Northern Ireland and includes some which report rainfall only. Details of the stations used may be obtained on request. These stations with some additions also form the basis of areal rainfall estimates published in *British Rainfall** . The values given in the table for Scotland and for England and Wales are the means of the values for the several districts within these countries. For each of the District Value Stations 1941-70 averages, weighted where records are incomplete, have been used to compute anomalies of the various climatic elements in Table 1 since January 1974. These averages may be obtained on request.

*London, Meteorological Office. *British Rainfall.* London, HMSO

District 0				
1 Lerwick	T	r	—	S
2 Wick	T	r	—	S
3 Stornoway	T	r	—	S
4 Fortrose	T	r	—	S
5 Onich	T	r	—	S
6 Baltasound	—	—	E	—
7 Stenness	—	—	E	—
8 Kinlochewe	—	—	E	—
9 Isle of Rhum	—	—	E	—
District 1				
1 Forres	T	r	E	S
2 Craibstone	T	r	—	S
3 Mylnefield	—	—	E	—
4 Dundee	T	r	—	—
5 Arbroath	—	—	—	S
6 Bush House	—	—	E	—
7 Edinburgh Blackford Hill	T	r	—	S
8 Pitlochry	—	—	E	—
Berwick-on-Tweed*	T	r	—	S
District 6				
1 Tiree	T	r	—	S
2 Dundeugh	—	—	E	—
3 Paisley	—	—	E	—
4 Abbotsinch	T	r	—	S
5 Auchincruive	T	r	E	S
6 Dumfries	T	r	—	S
7 Eskdalemuir	T	r	E	S
District 2				
1 Berwick-on-Tweed*	T	r	—	S
2 Durham	T	r	E	S
3 Kielder Castle	—	—	E	—
4 Hull	T	r	E	S
5 Lincoln	T	r	E	—
6 Waddington	—	—	—	S
7 Cleethorpes	T	r	—	S
District 3				
1 Terrington St Clement	T	r	E	S
2 Lowestoft	T	r	E	S
3 Cambridge Bot Gdns	T	r	E	—
4 Cambridge Nat Inst of Agric Botany	—	—	—	S
5 Rothamsted	T	r	E	S
6 Shoeburyness	T	r	—	S
7 Clacton-on-Sea	—	—	E	—
District 4				
1 Huddersfield Ravensknowle	—	—	—	S
2 Bradford	T	r	E	—
3 Buxton	—	—	E	—
4 Nottingham	T	r	—	S
5 Raunds	T	r	E	S
6 Oxford	T	r	E	S
7 Ross-on-Wye	T	r	E	S
District 5				
1 Kew	T	r	—	S
2 Margate	—	—	E	—
3 East Malling	T	r	—	S
4 Hastings	T	r	E	S
5 Ryde	T	r	—	S
6 Kensington Palace	—	—	E	—
7 Porton	T	r	E	S
8 Hurley	—	—	E	—
District 7				
1 Newton Rigg	T	r	—	S
2 Moor House	—	—	E	—
3 Stonyhurst	T	r	—	S
4 Nelson	—	—	E	—
5 Rhyl	T	r	—	S
6 Ringway	T	r	—	S
7 Valley	T	r	—	S
8 Loggerheads	—	—	E	—
9 Botwnnog	—	—	E	—
10 Knutsford	—	—	E	—
District 8				
1 Llandrindod Wells**	T	r	E	S
2 Swansea	T	r	E	S
3A Lyonshall**	T	r	—	—
4 Cannington	—	—	E	—
5 Long Ashton	T	r	—	S
6 Plymouth Hoe	—	—	E	—
7 Teignmouth	T	r	—	S
8 Rosewarne	—	—	E	—
9 Falmouth	T	r	—	S
Northern Ireland				
1 Coleraine University	—	—	—	S
2 Moneydig	T	—	—	—
3 Aldergrove	T	—	—	S
4 Hillsborough	T	—	E	S
5 Armagh	T	—	—	S
6 Castle Archdale Forest	T	—	—	S
7 Stormont Castle	—	—	E	—
8 Lislap	—	—	E	—

The stations are numbered in order to show their positions on the map on page (ii)

T = air temperature
E = earth temperature at 30cm
r = rain days
S = sunshine

* No returns were received from Berwick-on-Tweed after April 1974

** Owing to a site change at Llandrindod Wells, Lyonshall was used for T and r after March 1974. No earth temperature and sunshine data from Llandrindod Wells were used after March 1974.

Maps

The published maps are simplified and are meant to give only a general impression of the distribution of the climatological elements. The value of an element at a point should be determined from tabulated data rather than by attempting to read it from the relevant map. The distribution of precipitation is given by means of isohyets on a full-page map. The analysis is based upon data from about 6500 stations and in order to improve legibility certain isohyets may be omitted in areas of heavy rainfall. A page of four maps based on all available data illustrates the mean 09h pressure at MSL, the mean air temperature at MSL, the mean daily bright sunshine and the difference of mean 30cm earth temperature from the 1941-70 average. Acknowledgment is made to the Director of the Meteorological Service, Dublin for kind permission to include certain data on the pressure map. The temperature map also includes mean sea-surface temperatures in coastal waters. These values are shown in circles round the coast and are derived from readings from ships under way (for the sea areas 1 to 4 shown on the map on page (ii)), and from the lighthouses or stationary light vessels named on the same map. The distribution of mean daily bright sunshine is given in hours per day. The averages of earth temperature at 30cm used to prepare data for the anomaly map may be obtained on request.

Table 2 Solar radiation and illumination

Data of the direct component of solar radiation at Kew Observatory were first published in the *Monthly Weather Report* in 1935 as Table III(c) which became Table III(b) in 1940. In 1948 were added data on total illumination (illumination intensity on a horizontal surface) for Kew and in 1950 data on illumination for Kingsway (London). In 1956 the solar radiation data published were changed to measurements of total

solar radiation and diffuse solar radiation and data for other stations were added. The table was re-numbered Table XIII in 1957 and Table 2 in 1971.

The instruments used for the radiation records are Moll-Gorczynski solarimeters. Meteorological Office pattern bimetallic actinographs may be used as standby instruments for recording total radiation. Daylight illumination is measured photoelectrically (Kew Mk V instrument). From 1 January 1957 the radiation values have been measured in accordance with the International Pyrheliometric Scale (1956). If in any month the data for any days are incomplete owing to instrumental or other faults, these data are completed by estimated values if at all possible, using other available radiation data. The mean daily value for complete days is then taken but if seven or more days in the month are still incomplete then the daily mean for the month is not published. The daily means for the year are computed from the monthly means. Up to and including the table for December 1965, no value for an extreme was given when it was possible that the extreme value for the month or for the year occurred on a day for which the data were either incomplete or estimated. In this table, with effect from January 1966, if the extreme value has been obtained from the data which have been partly or wholly estimated then the value is given in parentheses().

It is sometimes found advisable to apply revised calibration constants retrospectively; the values published in this table are liable therefore to correction. A review of all published data is constantly being carried out and any necessary amendments are issued as they become available.

Table 3 Summary of daily observations

Summaries of daily observations appeared in the *Monthly Weather Report* from its inception in 1884. In 1914 these data were collected into one table, almost identical to its present form called Table III which became Table 3 in 1971. From January 1974 stations have appeared alphabetically under counties arranged as far as possible in a geographical order (north to south and east to west) within climatological districts.

Statistics in parentheses () have been prepared using estimates to replace missing data. Values of averages used in this table may be obtained on request. Explanatory notes now follow.

HEIGHT OF STATION. As intimated earlier in the note on heights, the height given in the third column of the table refers to the ground on which the raingauge stands. In general it may be assumed that observations of other elements, with the occasional exception of sunshine, are made in the immediate vicinity of the raingauge. Notable exceptions occur at Sourhope and Ventnor where all observations other than rainfall are made at 274 metres and 60 metres(m) above MSL respectively.

AIR TEMPERATURE. The times at which maximum and minimum temperatures are read at each station are given in the second column of the table. Where the hours are printed independently the extreme temperatures refer to periods of 24 hours ending at the stated time. A maximum temperature read at 09h is credited to the previous day. Where the hours are shown linked by a dash thus, 21-9, the maximum temperature refers to the period 09h to 21h and the minimum temperature to the period 21h to 09h. In such cases the day minimum and night maximum temperatures are also read. Monthly mean temperatures for stations at which extremes are read at different times are not strictly comparable.

The measurements of air temperature are obtained from thermometers exposed in white painted louvered screens supported over short grass in the open, the bulbs of the thermometers being 1.25m above ground. The nearest object should be at least twice its height away from the screen. Two measurements of air temperature are published for Eskdalemuir, Kew and Lerwick: one is obtained from an electrical resistance aspirated psychrometer at 1.25m above the ground and the other from thermometers in a louvered screen as above, except at Kew where the louvered screen is on the north wall of the Observatory and about 8m above the general level of the ground.

EARTH TEMPERATURE. Measurements of earth temperature are taken at 09h from special thermometers suspended in steel tubes sunk vertically in the ground, the bulbs being at depths of 30cm and 100cm. The tubes are fitted with covers so that water, etc. will not collect in the interior.

RAINFALL. The rainfall total includes water derived from all forms of precipitation collected in the rain gauge. The daily amount for any station is the total accumulated during the 24 hours from 09h on one day to 09h on the next. The total is credited to the former of the two days as the greater part of the period occurs thereon; thus, the amount of rainfall measured at 09h on the first day of a certain month is included in the monthly total for the previous month.

WEATHER (NUMBER OF DAYS). **Precipitation:** Every day (defined as the period 09h to 09h) during which the total precipitation is at least 0.2 millimetres (mm) and again when it is at least 1.0mm is counted. A 'trace' of precipitation (less than 0.05mm) is excluded by the lower limit and thus most occasions on which precipitation is wholly in the form of dew are excluded.

Snow or sleet: Every day when snow or sleet (rain or drizzle and snow) is observed to fall at any time between midnight and midnight is counted even though the quantity is so small that no measurable precipitation is collected in the rain gauge.

Snow lying at 09h: Every day when snow is lying at 09h is counted provided that the snow covers more than one half of the ground easily visible from the station and the altitude of this ground does not differ by more than 30m from that of the station. In judging if more than one half of the ground is snow covered no account is taken of bare patches under trees or of areas occupied by water.

Hail: For the purpose of this summary hail is defined as pieces of ice with diameters of 5mm or more falling either separately or agglomerated into irregular lumps, and the day is between midnight and midnight.

Ice pellets, etc: A day of ice pellets, etc. is counted if, during a period midnight to midnight, any of the following occur: ice prisms or snow grains, snow pellets or ice pellets less than 5mm in diameter.

Thunder heard: A day of thunder is counted when thunder is heard at any time during the period midnight to midnight.

Fog at 09h: A day of fog is one on which at 09h the visibility is less than 1000m in the direction of worst visibility. Any variation in the time of observation may make a great difference to the statistics of fog frequency.

Air frost: An air frost is counted when the minimum air temperature read at either 09h or 21h is below 0°C.

Grass minimum below 0°C: A day of grass minimum temperature below 0°C is counted when the reading on the grass minimum thermometer at 09h is below 0°C, the thermometer having been set and exposed at 21h or soon after sunset the previous evening or, at stations where this is not possible, at 09h the previous day. The time of setting the thermometer should not vary from day to day and the temperature is credited to the day of reading. The grass minimum temperature refers either to the 24 hour period 09h to 09h or to the shorter period covering the night, for example, sunset to 09h.

Concrete minimum below 0°C: At a number of stations a minimum thermometer is set and exposed at the same time as the grass minimum thermometer but with its bulb resting on the centre of the smooth surface of a slab of concrete of specified standard dimensions and composition. A day of concrete minimum temperature below 0°C is analogous to a day of grass minimum temperature below 0°C.

Gale: A day of gale is counted when a mean wind speed reaches or exceeds, or is estimated to have reached or exceeded 34 knots (kt) (force 8 on the Beaufort Scale) over a period of at least several minutes (10 minutes in the case of a station equipped with an anemograph) during the period midnight to midnight.

SUNSHINE. The sunshine recorder is generally insensitive to sunshine when the sun is at an altitude of less than about 3° elevation. The symbol S in the column headed 'exposure' indicates that obstacles obstruct the rays of the sun during more than 5 per cent of the period during which the sun is over 3° above the horizon. Details of percentage obstruction at sites annotated S are available on request.

Table 4 Summary of observations at fixed hours

Fixed hour observations of various elements have appeared in the *Monthly Weather Report* since 1906 when the hours were 09, 21h for voluntary climatological stations and 08, 18h for official (then known as telegraphic reporting) stations. In 1909 the hours became 09, 15, 21h and 07, 13 and 18 or 21h respectively. The table assumed its present form in 1914 but it was not called Table IV until 1915. The hours for official stations became 07, 13, 18 and 21 or 01h in 1923 and 00, 06, 12, 18h in 1944. In 1945 the hours for all stations became 03, 09 15 and 21h. Since January 1974 stations have appeared in alphabetical order under counties which have been arranged geographically within climatological districts.

Observations may not be available for all stations at all the four hours quoted above and no summary is published for any element for which data are incomplete. Notes on the elements summarized now follow.

MEAN PRESSURE. The atmospheric pressure is expressed in millibars (mb); 1 mb = 100 Newtons/m^2 (1000 dynes/cm^2). Barometer readings are corrected for local conditions of gravity, temperature and elevation so as to obtain values of air pressure at MSL. The averages of atmospheric pressure at MSL at 09h used in this table refer to the period 1941-70 and are given in Climatological Memorandum No 51A obtainable from the Meteorological Office.

HUMIDITY. Monthly mean values of vapour pressure and relative humidity are calculated from daily values based upon readings of dry-bulb and wet-bulb thermometers in louvered screens except at Eskdalemuir, Kew and Lerwick where readings of aspirated psychrometers are used. The humidity values are derived either by the use of a humidity slide rule or from hygrometric tables both of which are based upon a formula by Regnault. The hygrometric tables (Met O 265) are issued by the Meteorological Office and published by Her Majesty's Stationery Office.

CLOUD AMOUNT. The unit used to indicate the proportion of the sky covered by cloud is the 'okta' or eighth of the sky. The scale runs from 0 which indicates a cloudless sky to 8 which is a completely overcast sky. The phrase 'sky obscured' is an abbreviation for 'sky obscured or cloud amount cannot be estimated' previously indicated in this table by the figure 9.

SURFACE WIND SPEED AND DIRECTION. Speeds are adjusted to an effective height of 10m. At a station which has an anemograph the mean speed and mean direction over an observation period of 10 minutes ending at the hour are used. However, if there has been a significant change in speed (10 kt or more) or direction (30 degrees or more) and the new mean value has been maintained for at least 3 minutes then this value is used instead. Where there are indicating instruments only, the means of several 15 to 20 second readings taken over the period of observation are used but again, if there has been a significant change the means of several readings after the change are used instead. At a station with no wind instruments an eye estimate is made of direction, and speed is estimated using the Beaufort scale of wind force.

Table 5 Number of days with maximum and minimum temperatures between given limits

For the year as a whole this table has been published in the *Monthly Weather Report* since the summary for 1913 and has also appeared monthly since January 1956. Data for about 20 selected stations are given in the table which, in 1913, was called Table IV and, after three years as Table VIII, it became Table IX from 1917 to 1951. The table reverted to Table VIII in 1952 and it was re-numbered Table 5 in 1971. For stations at which extreme temperatures are read at both 09 and 21h, Table 5 contains only day maxima and night minima. Thus the statisics for these stations are not strictly comparable with statistics for those at which extremes are read at 09h only (see notes on air temperature, Table 3).

Table 6 Summary of autographic records of wind

Tables in a similar form to this summarizing monthly and annual wind data for stations with anemographs were first published in the *Monthly Weather Report* in 1914. At first the monthly table was called Table V but it became Table II in 1915; minor revisions were made to it in 1923 and 1956 and it was re-numbered Table 6 in 1971. The annual table began as Table XI, changed to Table XII in 1915, reverted to Table XI in 1919 and became Table IX in 1952. It was re-numbered Table 6 in 1971, becoming strictly analogous to its monthly counterpart. From January 1974, stations have been listed alphabetically in counties which have been arranged geographically within climatological districts. The majority of records used in the preparation of this table are now obtained from electrical anemographs, the remainder being from pressure-tube anemographs.

Up to 1920 all available records were summarized regardless of missing data. In 1921 records having 366 hours or more missing during a year were not summarized in the annual table and in 1923 this limit was raised to 500 hours. No such limitation appears to have been placed on monthly data but from 1922 some records described as 'defective' were not published. From 1954 no monthly summaries were published of records with more than 80 hours missing. From the same year entries in the columns headed 'highest velocities' in both monthly and annual tables were placed in parentheses () - which were changed to square brackets [] in 1966 - if it was thought that these values might have been exceeded during a period of defective or missing record. In 1971 and 1972 the criteria given below applied to the publication of data in this table.

1. The distribution of hourly mean values of wind speed was not published monthly if
   (a) data were missing or estimated for more than 80 hours, or
   (b) data were missing or estimated for 80 hours or less but there were 40 or more consecutive hours of missing or estimated data.

The 80 and 40 hours correspond broadly to 10 per cent and 5 per cent of the month and such a loss is considered acceptable.

2. The distribution of hourly mean values of wind speed was not published annually if
   (a) data were missing or estimated for more than 800 hours, or
   (b) data were missing or estimated for 800 hours or less but there were 400 or more consecutive hours of missing or estimated data.
3. Highest hourly wind and gust was published even if the distribution of hourly mean values of wind speed was not published, but only if the values were deemed (by a comparison with neighbouring stations) as being unlikely to have been exceeded during any period of missing observations.
4. A mean hourly wind speed was not published if the distribution of hourly mean values of wind speed was not published. The value was computed by dividing the sum of the actual and estimated hourly mean wind speeds by the total number of hours for which the data were summed.
5. If the above criteria resulted in no summary or only a partial summary, the entry 'Defective record' was inserted in the table.

From the beginning of 1973 criteria 1 to 5 above have been modified as follows:

1 and 2:	Delete the words 'or estimated' wherever they occur,
3 and 4:	No change,
5:	An entry of 'defective record' means that some data are available but, for various reasons which include those stated in 1 and 2, they have not been summarized.

The classification of surface wind speed is based on the Beaufort scale of wind force which ranges from 0 representing no wind to 12 representing hurricane force (see *Observer's Handbook,* 3rd Ed. pages 82 and 83). The equivalent speeds given in the Beaufort scale apply only to an anemograph complying with the exposure specification 'head 10m above ground in the open'. The table includes some information concerning the actual exposure of the instrument at each station. 'Height of vane' refers to the height of the wind-speed sensor, that is, the vane of a pressure-tube anemograph or the cups of an electrical anemograph. Effective height is the height over open level terrain in the vicinity of the anemograph at which, it is estimated, the same mean wind speeds as those actually recorded would occur. In the columns headed 'number of hours' under the general heading 'distribution of hourly mean values of wind speed' the entries refer to the number of 60-minute periods beginning at exact hours in each of which the mean wind speed (not adjusted to an effective height of 10m) was between the stated limits. These column limits are the equivalent speeds given in the Beaufort scale and correspond to wind speeds (meaned over an hour) of Force 8 and above (gales), Forces 7 and 6 (strong winds), Forces 5 and 4 (moderate breezes), Forces 3 and 2 (light breezes) and Forces 1 and 0 (calm or nearly calm). The 'highest hourly wind' refers to a period of 60 minutes beginning at an exact hour. Under the heading 'veer from N' the direction in degrees from which the wind was blowing is stated, for example the entry for an east wind is 090, that for a south wind is 180 and so on.

Table 7 Number of hours with gusts exceeding 33 knots and 47 knots in each month and during the year

This table appears in the Annual Summary. It was first published in the *Monthly Weather Report* in 1934 as Table XIIA; it became Table X in 1952 and Table 7 in 1971. When a period of missing or defective record rendered a value doubtful, that value was placed in parentheses () and from 1966 in square brackets []. The value was omitted if it was considered that the record was excessively incomplete. From 1971 no values have been published for months when the distribution of hourly mean values of wind speed in Table 6 was not published, except where there was reasonable certainty (by a comparison with neighbouring stations) that there were no hours with gusts exceeding the limit during any period of missing or estimated data. No annual values have been published if data for any month were missing. From January 1973, a change in the procedure for the extraction of number of hours of gusts has resulted in a slight change in the statistic. Up to and including December 1972, the number of hours of gusts in any windy period was determined by considering the interval of time between the first gust and the last gust to exceed the threshold. From January 1973 the tabulation has included the number of 60-minute periods beginning at exact hours during which gusts above the relevant threshold have occurred. Thus, the new procedure yields slightly higher values of the number of hours of gusts than did the old procedure. An investigation was undertaken to obtain empirical relationships between the old and new statistics and details can be made available on request.

Table 8 Dates on which gusts exceeded 47 knots during the year

A similar table to this appeared in 1908 as an appendix to the *Weekly Weather Report* and was transferred to the *Monthly Weather Report* in 1914 as Table XV. In 1919 and 1920 and from 1923 to 1951 the table number was XIV. In 1952 it was re-numbered Table XII and in 1971, Table 8.

This table includes all dates on which gusts exceeding 47 kt were recorded. From about 1940 the table also included notes of all periods during which the record was missing or defective. However, from 1971 reference has been restricted to those periods of missing or defective data during which it is considered that gusts may have exceeded 47 kt thus indicating that the number of occasions published may be too few.

Table 9 Occasions on which the maximum hourly mean wind was 41 knots or more (strong gale) during the year

Although these data were published for the years 1900 to 1904 in the *Annual Report of the Meteorological Council;* they were first tabulated in the *Monthly Weather Report* in 1905 but from 1908 to 1913 they were given as an appendix to the *Weekly Weather Report.* The table was transferred again to the *Monthly Weather Report* in 1914 as Table XIV and it became Table XIII in 1919; the table was called Table XI from 1952 and it was re-numbered Table 9 in 1971.

All recorded occasions are included and, from 1971, there has also been a note of any period of missing or defective data during which it is considered that the criterion may have been met.

Table 10 Highest and lowest maximum and minimum temperatures during the year at each station

This table is published in the summary for the year and dates from 1913 when, as Table I, it gave the temperature and date of the coldest day (lowest maximum temperature) and warmest night (highest minimum temperature) in the year at as many stations as possible. In 1914 it became Table V and contained, in addition to the above data, similar details of the coldest night (lowest minimum temperature) and warmest day (highest maximum temperature) in the year. In 1969 the table assumed its present title and in 1971 it was re-numbered as Table 10.

For those stations at which extreme temperatures are read at both 09 and 21h the temperatures quoted are night minima and day maxima (see air temperature notes on Table 3).

Table 11 Number of days on which the duration of sunshine was between given limits in each month

Published in the Annual Summary, this table dates from 1913 when, as Table II, monthly and annual frequencies were given for about 20 stations. In 1914 the table became Table VI and in 1949 the annual frequencies were discontinued. The table was re-numbered Table 11 in 1971.

Table 12 Number of days with rainfall between given limits

This table, which gives yearly data only, has appeared in the Annual Summary since 1914. At first it was headed Table IX; it became Table VIII in 1916 and Table VII in 1952; it was re-numbered Table 12 in 1971. The stations selected for this table numbered around 20 up to 1955 since when the number has been about 30.

Quality control of data

Prior to the compilation of the summaries which appear in the Tables, the data are subjected to critical scrutiny to detect and eliminate as far as possible errors arising from misreading of instruments and miscopying. Computer methods are being used increasingly to detect those values which, on meteorological grounds, appear suspect. Human scrutiny then determines whether the data are, in fact, erroneous and correction action is taken in consultation with the observers concerned. The great advantage of computer scrutiny is that all data can be subjected quickly to a common level of checking which was not attainable with conventional 'hand and eye' methods. For some years, data summarised in Tables 2, 4 and 6 have been subject to computer scrutiny, and during 1972, methods were developed for the extension of this type of scrutiny to Table 3 data. All Tables are now prepared by computer after corrections have been incorporated.

Stations completing climatological returns

The following are amendments to the full list of stations completing climatological returns which was published in the Introduction to the Monthly Weather Report for 1972.

Deletions

Exeter (Southam) Stornoway Coastguard Wellington

The following stations closed during the years stated:

1973

Bessbrook	Black Mountain	Cirencester
Comrie	Duntulm	Fort William
Glamis Castle	Lauder	Roscor
Spadeadam	Wakehurst	West Camel

1974

Addington	Belper	Cheddar
Chivenor	Church Fenton	Coventry
Cricket Malherbie	Crossmyloof	Eastbourne Coastguard
Fettercairn	Kildonan	Manby
Marton	Middlesbrough	Rochdale
Sourhope	Sule Skerry	Swyddffynnon
The Lake	Virginstowe	Walton-on-Naze

Returns from the following stations ceased during the years stated:

1973

Burlingham Finchampstead Weston-super-Mare

1974

Berwick-on-Tweed Tredegar

Additions - Returns commenced during 1974

The following should be included in the full list of stations:

Station (County)	Type	First published in MWR	Lat ° ′	Long ° ′	Grid Reference	Authority
Aberdare (Mid Glamorgan)	Sb	Not Publ.	51 43N	03 28W	22-991032	Director of Works
Ballywatticock (Co. Down)	Sun	Not Publ.	54 34N	05 41W	IJ(33)-516719	Mr. D. Crowe
Benson (Oxford)	SaA	Not Publ.	51 37N	01 05W	41-633909	Meteorological Office
Blairvadach (Dunbarton)	C	Not Publ.	56 01N	04 47W	26-260852	Principal, Sailing and Outdoor Centre
Blyth (Northumberland)	A	Not Publ.	55 08N	01 30W	45-316822	Alcan Ltd
Brawdy (Dyfed)	SaA	Not Publ.	51 52N	05 08W	12-851248	Meteorological Office
Bridgend (Mid Glamorgan)	C	Not Publ.	51 30N	03 33W	21-919796	Welsh Nat. Water Authority
Broadwell (Warwickshire)	C	Not Publ.	52 18N	01 19W	42-457659	Mr. G.H. Thompson
Carmoney (Co. Londonderry)	C	Not Publ.	55 01N	07 14W	IC(24)-503197	Department of the Environment
Cilfynydd (Mid Glamorgan)	SbA	Not Publ.	51 38N	03 18W	31-099939	CEGB
Coulport (Dunbarton)	C	Not Publ.	56 03N	04 52W	26-212889	R.N. Naval Ordnance
Coventry Airport (West Midlands)	C	Not Publ.	52 22N	01 29W	42-348743	Director, Environmental Health Department, City of Coventry
Crianlarich (Perth)	C	Not Publ.	56 25N	04 39W	27-367284	West of Scotland Agricultural College
Cwmystradllyn (Gwynedd)	C	Not Publ.	52 59N	04 09W	23-557442	Gwynedd River Authority
Fair Isle (Zetland)	Sb	Not Publ.	59 32N	01 38W	410-210712	Mr D Wheeler
Harrow Weald (Greater London)	C	Not Publ.	51 37N	00 20W	51-153920	Controller of Engineering
Haughley (Suffolk)	Ag	Not Publ.	52 14N	00 58E	62-041640	Haughley Research Farm

Station (County)	Type	First published in MWR	Lat ° ′	Long ° ′	Grid Reference	Authority
Kirton (Lincoln)	Ag	Not Publ.	52 54N	00 00	53-299395	MAFF
Lentran (Inverness)	C	Not Publ.	57 27N	04 22W	28-878436	Mr. Geddes
Linton-on-Ouse (North Yorkshire)	A	Not Publ.	54 03N	01 15W	44-492615	Meteorological Office
Llyn Alaw (Gwynedd)	C	Not Publ.	53 20N	04 27W	23-384854	Gwynedd River Authority
Loch Oich (Inverness)	C	Not Publ.	57 03N	04 43W	27-303982	Mr. D. Brush
Long Lawford (Warwick)	C	Not Publ.	52 23N	01 18W	42-473759	Mr. S. Burt
Low Etherley (Durham)	C	Not Publ.	54 39N	01 44W	45-169289	Mr. K. Cook
Pathhead (Midlothian)	C	Not Publ.	55 53N	02 50W	36-413662	Scot. Plant Breeding Research Station
Scampton (Lincoln)	A	Not Publ.	53 19N	00 33W	43-966802	Meteorological Office
Scatsta (Zetland)	C	Not Publ.	60 27N	01 18W	411-382730	Scot. Plant Breeding Research Station
Snaizeholme (North Yorkshire)	C	Not Publ.	54 16N	02 15W	34-830865	Mr. H. Kemp
Southampton Weather Centre (Hampshire)	Sa	Not Publ.	50 54N	01 24W	41-420115	Meteorological Office
South Gare (Cleveland)	A	Not Publ.	54 39N	01 08W	45-557283	Tees and Hartlepool Port Authority
Stanford-le-Hope (Essex)	C	Not Publ.	51 30N	00 26W	51-685814	Thurrock District Council
Tievenny (Co. Tyrone)	C	Not Publ.	54 43N	07 30W	IH(23)-325863	Department of the Environment
Tregaron (Dyfed)	C	Not Publ.	52 15N	03 58W	22-667625	Nature Conservancy Council
Widdybank Fell (Cumbria)	C	Not Publ.	54 40N	02 17W	35-818298	Nature Conservancy Council

The following changes took place during 1973 and 1974

New Site and/or Authority:

October	1973	Filton (Avon)	51° 31′N	02° 35′W	NGR. 31-600805
November	1973	Stornoway (Ross and Cromarty)	58° 13′N	06° 19′W	NGR. 19-464332
January	1974	Everton (Hampshire)	50° 44′N	01° 34′W	NGR. 40-302937
April	1974	Llandrindod Wells (Powys)	52° 14′N	03° 22′W	NGR. 32-056616
			Authority: Llandrindod High School		
September	1974	East Malling (Kent)	51° 17′N	00° 27′E	NGR. 51-708570

New Authority:

Alwen (Clwyd)	North West Water Authority
Bradford (West Yorkshire)	Bradford Metropolitan District Council
Brighton (East Sussex)	Brighton Borough Council
Bugbrooke Mills (Northampton)	Anglian Water Authority
Buxton (Derby)	Borough of High Peak
Cardiff (South Glamorgan)	South Glamorgan Education Authority
Fraserburgh (Aberdeen)	Northern Lighthouse Board
Harrogate (North Yorkshire)	Yorkshire Water Authority
Hastings (East Sussex)	Hastings Borough Council
Haverfordwest (Dyfed)	Welsh National Water Development Authority
Hereford Sewage Works (Hereford and Worcester)	Welsh National Water Development Authority
Hull (Humberside)	Director, Leisure Services Department
Ilfracombe (Devon)	North Devon District Council
Ilkley (West Yorkshire)	Bradford Metropolitan District Council
Lake Vyrnwy (Powys)	Severn-Trent Water Authority
Lowestoft (Suffolk)	Waveney District Council
Moor House (Cumbria)	Nature Conservancy Council
Monks Wood (Cambridge)	Institute of Terrestrial Ecology
Plumpton (East Sussex)	Southern Water Authority
Scarborough (North Yorkshire)	Director of Technical Services
Shrewsbury (Salop)	Severn-Trent Water Authority
Southport (Merseyside)	North West Water Authority
Southsea (Hampshire)	Portsmouth City Environmental Health Officer
Stone (Stafford)	Animal Breeding Research Organisation

Change of type of station:

September	1974	Little Rissington (Gloucester)	Sa to SaA
October	1974	Ross-on-Wye (Hereford and Worcester)	SbA to C
November	1974	Bastreet (Cornwall)	C to Sb

Stations with new county names

Aber	(Gwynedd)
Aberporth and Aberporth RAE	(Dyfed)
Aberystwyth	(Dyfed)
Abingdon	(Oxford)
Aigburth	(Merseyside)
Alwen	(Clwyd)
Askham Bryan	(North Yorkshire)
Avonmouth	(Avon)
Bala	(Gwynedd)
Bardsey Island	(Gwynedd)
Bath	(Avon)
Bexhill	(East Sussex)
Birmingham, Edgbaston, Elmdon and King Edward School	(West Midlands)
Bodiam	(East Sussex)
Bognor Regis	(West Sussex)
Bolton	(Greater Manchester)
Botwnnog	(Gwynedd)
Bournemouth	(Dorset)
Bradford	(West Yorkshire)
Bramham	(West Yorkshire)
Bridlington	(Humberside)
Brigg	(Humberside)
Brighton and Brighton Marina	(East Sussex)
Bromfield	(Cumbria)
Brynamman	(Dyfed)
Bwlchgwyn	(Clwyd)
Cardiff	(South Glamorgan)
Carlisle	(Cumbria)
Carmarthen	(Dyfed)
Cartmel	(Cumbria)
Cawood	(North Yorkshire)
Ceinws	(Powys)
Cenarth Mill	(Powys)
Chopwellwood	(Tyne and Wear)
Christchurch	(Dorset)
Church Fenton	(North Yorkshire)
Cleethorpes	(Humberside)
Colwyn Bay	(Clwyd)
Corwen	(Clwyd)
Cottesmore	(Leicester)
Crumbland	(Gwent)
Cwmystwyth	(Dyfed)
Dale Fort	(Dyfed)
Eastbourne and Eastbourne Coastguard	(East Sussex)
East Hoathly	(East Sussex)
Esgairwen-Uchaf	(Dyfed)
Fernhurst	(West Sussex)
Filey	(North Yorkshire)
Filton	(Avon)
Finningley	(South Yorkshire)
Gatwick	(West Sussex)
Gogerddan	(Dyfed)
Great Dun Fell	(Cumbria)
Grizedale	(Cumbria)
Hampton Loade	(Salop)
Harrogate	(North Yorkshire)
Hartburn Grange	(Cleveland)
Hartlepool	(Cleveland)
Hastings	(East Sussex)
Haverfordwest	(Dyfed)
Hawarden Bridge	(Clwyd)
Hereford Sewage Works	(Hereford and Worcester)
Heversham	(Cumbria)
High Mowthorpe	(North Yorkshire)
Huddersfield, Oakes and Ravensknowle	(West Yorkshire)
Hull	(Humberside)
Hurn	(Dorset)
Ilkley	(West Yorkshire)
Ipsley Sewage Works	(Hereford and Worcester)
Kilnsea	(Humberside)
Lake Vyrnwy	(Powys)
Leeming	(North Yorkshire)
Letcombe Regis	(Oxford)
Littlehampton	(West Sussex)
Llandrindod Wells	(Powys)
Llangenny	(Powys)
Llety-evan-Hen	(Dyfed)
Llwynon	(Mid Glamorgan)
Loggerheads	(Clwyd)
Long Ashton	(Avon)
Lyonshall	(Hereford and Worcester)
Malham Tarn	(North Yorkshire)
Malvern	(Hereford and Worcester)
Manchester Weather Centre	(Greater Manchester)
Marholm	(Cambridge)
Marton	(Cleveland)
Middlesbrough	(Cleveland)
Milford Haven	(Dyfed)
Moel Cynnedd	(Powys)
Monks Wood	(Cambridge)
Moor House	(Cumbria)
Mumbles Head	(West Glamorgan)
Neath	(West Glamorgan)
Newport	(Gwent instead of Monmouth)
Newport	(Salop instead of Shropshire)
Newton Rigg	(Cumbria)
North Heath	(West Sussex)
Orielton	(Dyfed)
Oswestry	(Salop)
Penmaen	(West Glamorgan)
Pen-y-ffridd	(Gwynedd)

Pershore and Pershore College of Horticulture	(Hereford and Worcester)
Pickering	(North Yorkshire)
Plumpton	(East Sussex)
Pontefract	(West Yorkshire)
Porthcawl	(Mid Glamorgan)
Port Talbot	(West Glamorgan)
Prestatyn	(Clwyd)
Preston Wynne	(Hereford and Worcester)
Rhoose	(South Glamorgan)
Rhyl	(Clwyd)
Ringway	(Greater Manchester)
Rochdale	(Greater Manchester)
Rogate	(West Sussex)
Ross-on-Wye	(Hereford and Worcester)
Rustington	(West Sussex)
Ruthin	(Clwyd)
St Helens	(Merseyside)
Scarborough	(North Yorkshire)
Sellafield	(Cumbria)
Shawbury	(Salop)
Sheffield and Sheffield University	(South Yorkshire)
Shrewsbury	(Salop)
Silpho Moor	(North Yorkshire)
Skokholm	(Dyfed)
Slaidburn	(Lancashire)
Southport	(Merseyside)
South Shields	(Tyne and Wear)
Speke	(Merseyside)
Swansea	(West Glamorgan)
Swyddffynnon	(Dyfed)
Tenby	(Dyfed)
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Trawsfynydd	(Gwynedd)
Tynemouth	(Tyne and Wear)
Tredegar	(Gwent)
Usk	(Gwent)
Valley	(Gwynedd)
Wallingford	(Oxford)
Walsall	(West Midlands)
Washington	(Tyne and Wear)
West Kirby Park	(Merseyside)
Whitby and Whitby Coastguard	(North Yorkshire)
Whiteford Burrows	(West Glamorgan)
Wilsden, Bingley	(West Yorkshire)
Wilton Park	(West Yorkshire)
Wittering	(Cambridge)
Worthing	(West Sussex)
Wrexham	(Clwyd)
Wyton	(Cambridge)
York, Heslington	(North Yorkshire)

Corrections

National Grid Reference for Little Rissington (Gloucester) should be 42-210193
Shawbury: Station type should be SaA not Sa
Wilsden (Bingley): Station type should be SbA not Sb
Please correct the spelling of Morcambe to 'Morecambe'.

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